Comments of Conectiv Energy Supply, Inc. and Beacon Landfill Holdings LLC Provided to the Department of Energy Resources

October 15, 2008

Conectiv Energy Supply, Inc. ("CESI") and Beacon Landfill Gas Holdings LLC ("Beacon") (collectively, "CESI") are pleased to participate in the stakeholder process and provide the Massachusetts Department of Energy and Resources ("DOER") with information and facts regarding new or modified criteria that should be required for landfill methane gas, currently an eligible Class I renewable resource. CESI and Beacon propose that the DOER amend the current Renewable Portfolio Standard regulation, at 225 CMR 14.05(1)(a)5, to allow landfill gas to be transported through the existing natural gas pipeline system and commingled with natural gas. In this way, the DOER will maximize the energy and environmental benefits of landfill gas as a renewable resource and align the DOER's treatment of imported landfill gas with legislative intent and with other states in the region.

Introduction

CESI is a wholly owned subsidiary of Pepco Holdings, Inc. ("PHI"). PHI (NYSE ticker symbol: POM) is an energy holding company formed as a result of the merger between two distribution companies, Pepco and Conectiv. The company delivers approximately 50,000 gigawatt-hours of power annually to more than 1.8 million customers in Delaware, the District of Columbia, Maryland, New Jersey and Virginia, making it one of the largest electricity delivery companies in the mid-Atlantic region. PHI engages in regulated utility operations by delivering electricity and natural gas, and provides competitive energy products and services to residential and commercial customers.

CESI is a FERC-regulated wholesale electric and gas company. In addition to a 6,000 plus MW portfolio of generation and load in the PJM, New York and New England electric power markets, CESI also manages approximately 2 Bcf of natural gas in the Northeast. Part of this gas portfolio includes the purchase of high Btu landfill gas from Beacon.

Beacon operates two large high Btu landfill gas projects at the Greentree and Imperial landfills in Western Pennsylvania. In July 2006, Beacon began construction of the projects, and in 2007 Greentree was awarded high Btu project of the year by the U.S. Environmental Protection Agency's ("EPA") Landfill Methane Outreach Program ("LMOP"). Fifty million dollars in debt funding was provided by the John Hancock Life Insurance Company. The two projects are 100% owned by Beacon Landfill Gas Holdings LLC, a special purpose company formed for the purpose of project financing.

Legislation Recognizes Landfill Gas as a Renewable Resource

Originally passed as part of the Electric Industry Restructuring Act in 1997, M.G.L. c. 25A, section 11F requires that all retail electric suppliers purchase a minimum percentage of their electricity supplies from qualified new renewable generation units fueled by one of several renewable fuels. Chapter 25A, as promulgated in 1997, explicitly recognized, without restriction, landfill gas as a type of renewable energy technology that may serve as a Class 1 renewable resource. Landfill gas was one of several fuel types and technologies that would "stimulate development of new electric generating units that use renewable fuels and technologies" (See Background Document on the Proposed Regulation for the Renewable Energy Portfolio Standard, October 3, 2001). Notably, from the outset, the Legislature recognized landfill gas as an important component of the Massachusetts allowable renewable portfolio fuel mix.

An Act Relative to Green Communities ("the Green Communities Act" or the "Act") replaced M.G.L. c. 25A, section F in its entirety. In its revisions to c. 25A, the Legislature underscored the central role of existing renewable fuel resources (including landfill gas), significantly expanded the fuel types and the technologies available to serve as qualified renewable generation units, and developed an entirely new Alternative Portfolio Standard (APS) to encourage coal gasification, flywheel energy storage and combined heat and power systems.

The Green Communities Act was enacted to increase energy efficiency, develop renewable fuel supplies, and boost new energy technologies. As Governor Patrick stated in signing the bill, "this legislation will reduce electric bills, promote the development of renewable energy, and stimulate the clean energy industry." Similarly, House Speaker DiMasi, who first filed the legislation in 2007, reinforced the Governor's comments and noted that the legislation will "increase the use of renewable energy" and thus "curtail the use of fossil fuels, improve our environment and save [consumers] money." Notably as well, Senate President Murray emphasized the bill's positive impact upon the development of clean energy and alternative fuel sources.

The clear intent of the Act is captured in the key energy goals mandated for Massachusetts to achieve by the year 2020. These goals include reducing reliance on fossil fuels and meeting at least 20% of the Commonwealth's electricity demand through renewable and alternative energy generation. Other important goals include meeting at least 25% of the Commonwealth's electricity demand through energy efficiency and demand response and reducing the state's energy consumption by at least 10% by 2017.

In the passage of the Green Communities Act and the new Renewable Portfolio Standard ("RPS") legislation, the Legislature once again recognized the important role of landfill gas as a RPS Class 1 resource without restriction. The new RPS requirements

will play a huge role in the Commonwealth's success in increasing renewable and alternative energy generation and reducing the use of fossil fuels. Consistent with the intent of the Green Communities Act, landfill gas, also known as landfill methane gas ("LMG"), utilized as a fuel source, will decrease pollution, diversify fuels, decrease reliance on fossils fuels and create benefits to consumers.

While there is no Legislative restriction on the use of landfill gas, 225 CMR 14.05 currently limits LMG use in generating units to LMG conveyed directly to such units without the use of common carriers' transportation facilities (interstate pipelines). Thus, the use of landfill gas as a fuel from all sources is restricted. This limitation is inconsistent with the intent of the statute and wholly fails to consider the technological advances over the past decade and the important consumer and environmental benefits of LMG. Moreover, landfill gas was the only Class 1 renewable resource whose use was restricted by DOER regulations. As a result, CESI submits that the current regulatory limitation imposed on the use of landfill gas as a renewable fuel source should be modified in this proceeding to allow LMG that is transported through a common carrier pipeline and commingled and co-fired with natural gas to be an eligible Class I resource.

In support of its request, and as set forth in detail below, CESI submits, as the Legislature recognizes and consistent with the regulatory goals of the RPS program, that landfill methane gas represents an important energy source with significant environmental and consumer benefits. The following analysis will provide essential background regarding LMG production and processing, highlight the important benefits of LMG in Massachusetts and suggest revisions to the current RPS regulations.

High Btu Gas Processing Technology Is Efficient and Reduces Emissions

As part of any consideration of the benefits of utilizing landfill gas also known as LMG as a fuel, information regarding how it is produced, processed and regulated provides an important context. LMG is gas produced from the decomposition of waste in landfills. Raw LMG typically consists of 40% CO2 and 50% methane (CH4) with the remaining 10% consisting of nitrogen, oxygen, water vapor, volatile organic compounds and other impurities. The Clean Air Act (including amendments) and the EPA provide policy guidance and oversight at the federal level regarding the release of harmful compounds into the air from landfills. In general, all landfills of substantial size are required to collect raw landfill gases and destroy the harmful compounds and either beneficially use or destroy the methane gas. If the methane is destroyed in a flare, it produces additional CO2 (and CO and some nitrogen compounds) from the combustion process. To promote energy independence and reduce CO2 emissions, federal policies promote innovative landfill projects that reduce emissions from methane flares.

This federal approach creates opportunities for new technologies to evolve and expand the availability of landfill gas as fuel. In past years, methane gas from LMG was typically used as the fuel for on-site reciprocating engines that produced electric power or as a direct use boiler fuel or other direct use process project. According to LMOP, reciprocating engines account for approximately 69% of existing projects and 87% of energy produced by the end of 2007. Using traditional reciprocating engine technologies, LMOP calculates savings of over 180 million barrels of imported oil with production of approximately 11 billion kWh per year and 236 million cubic feet per day of direct use LMG. Typically, these projects capture and use 60-90% of the available methane gas from the raw LMG.

Over the past few years, pioneering gas processing technology has been applied to remove more of the impurities from raw landfill gas than past processing technologies and produce high Btu gas, which is a concentrated stream of methane gas (identical in composition to the methane in natural gas). In order to produce high Btu gas from LMG, substantial capital is invested in the processing equipment and well field collection equipment and additional costs are incurred as a result of higher operating and maintenance expense. This additional equipment reduces the emissions from the landfill site and allows for the more efficient collection of landfill gas. This high Btu LMG meets pipeline quality standards and is transported by pipelines to serve as fuel in gas-fired generation. The energy and environmental benefits of high Btu LMG justify these higher costs.

LMG Would Provide Important Benefits to Massachusetts

There are significant benefits associated with utilizing high-Btu LMG as fuel to power generating facilities in Massachusetts (and nationally). High Btu LMG as an eligible fuel source in Massachusetts would: (i) lower greenhouse gas emissions and overall pollution; (ii) increase efficiency of electric generation (more electricity with less fuel); (iii) increase the supply of domestic energy alternatives to displace foreign oil and LNG; (iv) enhance opportunities for development of innovative technologies; and (v) promote development of additional gas-fired generation. Each of these benefits is highlighted below.

Lower Greenhouse Gas Emissions and Overall Pollution

As noted, EPA requires landfills to collect and destroy landfill gas or to beneficially use it. High Btu efficient processing is the most environmentally sound method of utilizing LMG as compared to on-site landfill gas generation. A typical on-site generator uses a reciprocating engine similar to a truck and produces 0.6065 lb/mmbtu of NOx and 1.1676 lbs/mmbtu of CO emissions. By contrast, the use of high Btu LMG gas, transported by common carrier (interstate) pipeline to an efficient off-site electric generator, significantly reduces NOx emissions to approximately 0.0034

lb/mmbtu and CO to approximately 0.0050 lb/mmbtu. This is an improvement of 181 times for NOx and 234 times for CO over on-site electric generation. High Btu LMG processing, with stringent and efficient gas collection capabilities, is the most environmentally sound method of utilizing LMG, particularly as compared to on-site generation. Table 1 provides additional details on the dramatic emissions reductions associated with high Btu landfill gas.

Table 1

Emission Comparison
Processed, High Btu Landfill Gas and Off-Site Generation vs. On-Site Generation

	Off-Site Generation (Utilizing Processed High Btu Landfill Gas)	On-Site Generation	**Emission Ratio**
	lb/MMBtu (*)	lb/MMBtu (*)	**On-Site Engine/ Off-Site CC**
NOx	0.0034	0.6065	**181**
CO	0.0050	1.1676	**234**
PM10	0.0195	0.1035	**5**
VOC	0.0025	0.2074	**84**
SO2	0.0055	0.2575	**47**

Note: Off-site generation based on combined cycle generation; on-site based on gas engine generation

(*) Emission values based on average values for sample facilities taken from the U.S. Environmental Protection Agency's RACT/BACT/LAER Clearinghouse (RBLC) (conversions to lb/MMBtu done by Beacon Landfill Gas Holdings LLC for emission limits not specified in lb MMBtu)

Source: Beacon Landfill Gas Holdings LLC based on EPA air permit data from sample facilities

Increase Efficiency of Electric Generation

Moreover, high Btu LMG can be used more efficiently to produce electricity than on-site generation. The heat rate (or electrical energy conversion efficiency) of an on-site generator is between 8,800-10,000 mmbtu/kWh versus 7,000-8,800 mmbtu/kWh for an off-site efficient generator (i.e., the off-site generator is about 25% more efficient than the on-site generator). Therefore, a high Btu project that uses interstate pipelines to transport high Btu LMG to efficient off-site generators is approximately 25% more energy efficient than on-site electric generators that use LMG. Table 2 provides an example of the significant benefits of higher production with lower emissions achieved through these efficiency gains.

Table 2 EFFICIENCY AND EMISSIONS COMPARISON (On-Site vs. Off-site High btu Generation)

		High Btu Off-site Generator	On-Site Reciprocating Engine	Difference (Off-Site - On-Site)
Waste Tons in Place (WIP)	(tons)	4,000,000	4,000,000	0
Annual gas production	(Dth/yr)	723,600	723,600	0
Heat rate	(btu/kWh)	8,000	10,000	20%
Energy	(MWh)	90,450	72,360	18,090
NOx	(metric tonnes/yr)	1.12	199.07	(197.95)
CO	(metric tonnes/yr)	1.64	383.23	(381.59)
PM10	(metric tonnes/yr)	6.40	33.97	(27.57)
VOC	(metric tonnes/yr)	0.82	68.07	(67.25)
SO2	(metric tonnes/yr)	1.81	84.52	(82.71)

(Note: Table 2 based on source information in Table 1)

Displace Foreign Oil and Domestic Natural Gas and LNG

For every Btu produced and injected into the interstate pipeline, there is an equal amount of natural gas or LNG that is displaced. High Btu LMG consumed in gas-fired generation is the same quality of gas as natural gas with corresponding low emissions and environmental benefits. Existing high Btu LMG projects will provide an important new source of fuels to displace foreign oil and reduce the use of natural gas and LNG. This benefit can be achieved for ratepayers in the Commonwealth and New England through the delivery of high Btu LMG to generators located in Massachusetts and throughout New England.

Create Incentives for Developing New Technologies such as Carbon Sequestration

Another benefit of high Btu LMG projects is the potential for carbon sequestration. Carbon sequestration of CO2 is likely to play a significant role in future US environmental policy. As discussed, a high Btu LMG project separates the CO2 stream from the methane stream. Once the harmful compounds are destroyed during the processing cycles, the CO2 could be used for injection in oil wells or in gas wells that have been fully depleted. States such as Pennsylvania, which produce natural gas and oil, have these types of carbon sequestration applications within the state and groups are working to beneficially use the waste CO2 stream which is much more easily separated in a high Btu LMG project than through on-site generation. Successful development of CO2 sequestration technologies will further enhance the already significant environmental and energy benefits of high Btu LMG.

Promote Development of Efficient Generation

High Btu LMG projects encourage development of small competitive gas-fired generation. Massachusetts and New England will continue to need new generation to meet growing demand, especially near load centers. The use of high Btu landfill gas, a

renewable resource, as fuel for gas-fired generation coupled with the revenues received for delivery of renewable energy certificates improves the economics of developing new, smaller, distributed gas-fired generation in the Commonwealth.

Therefore, while high Btu LMG pipeline quality projects are relatively new, they can provide substantial energy, economic and environmental benefits for Massachusetts consumers. High Btu LMG will reduce the use of imported fuels, improve efficiencies over existing on-site landfill gas technologies, reduce pollutants and encourage carbon sequestration and promote the development of new innovative technologies. These are precisely the benefits the Legislature envisioned in passing the Green Communities Act and including landfill gas as a Class 1 fuel.

LMG Is Subject To Precise Tracking and GIS Verification

All facets of high Btu LMG production, transportation and metering are transparent, subject to verification and consistent with federal requirements. High Btu LMG will be transported into Massachusetts via existing natural gas pipelines and be subject to state-of-the-art verification and tracking mechanisms as required by federal regulators. To ensure precise monitoring and tracking, when gas (e.g., natural gas, LNG or LMG) is injected into the interstate pipeline system, a chromatograph or a series of chromatographs is used to accurately ensure that the quality of the gas meets pipeline standards. In addition, high Btu LMG is metered according to Federal Energy Regulatory Commission ("FERC") standards and guidelines. In order to ensure accountability, transportation agreements are required to establish the contract path from the high Btu LMG producer to the gas-fired generator. Gas is metered at the point of withdrawal by the gas-fired generator according to the same FERC standards and guidelines as applied to the producer at the point of injection. The gas-fired generator enters into the Generation Information System the proportionate energy produced attributable to the high Btu LMG consumed. Reports are generated on a quarterly basis that could be verified by the DOER and would be subject to audit as with other eligible fuels.

Other Jurisdictions Recognize LMG as A Renewable Resource

Other states in the Northeast recognize the benefits that LMG provides to consumers and currently allow LMG transported in interstate pipelines commingled and co-fired with natural gas to qualify as a Class 1 renewable resource. Specifically, Connecticut, New Hampshire, New York, New Jersey, Pennsylvania and Delaware allow high-Btu LMG as a renewable resource.

LMG Resources Are Available For Massachusetts without Market Impacts

Given the significant benefits associated with LMG, CESI analyzed the potential impact of existing and potential high Btu projects. CESI's analysis, as noted below, indicates that there is ample supply of LMG and that the impact of existing LMG development in the northeast would only increase the Renewable Energy Credit ("REC") market by approximately 3-6 % in 2013.

High Btu projects have, and will continue to represent, a small fraction of all LMG utilization projects because certain conditions need to be present to implement such a project. These conditions include:

1) sufficient landfill size to generate enough LMG to justify the economics of the gas processing equipment needed to upgrade the LMG to pipeline quality gas; based on our experience we estimate that threshold at landfills with at least 4 million tons of waste-in-place (WIP); and

2) reasonable proximity to an existing interstate natural gas pipeline. Too great a distance (outside of 5-10 miles) requires an enormous investment in a connecting pipeline and greatly increases the development time and cost owing to securing rights-of-way. Connecting pipelines can cost approximately $500,000 to over $1 million per mile.

According to the LMOP database, there were 445 landfills that had an LMG utilization project in place as of December 2007. Of these, only 17 are high Btu projects. None of these 17 existing high Btu projects are located in New England and only 8 of the 17 high Btu projects are located within the PJM (excluding Ohio) and New York ISO electric markets that are interconnected with ISO New England. Thus, only 7 projects could potentially import high Btu gas into New England, since one project has a committed local gas purchaser. If the PJM market was extended to Ohio, another 3 projects representing about 5% of the REC requirement might impact the market.

As set forth in Table 3, CESI estimates that these 7 projects would represent a maximum of 8% of the 2013 Massachusetts REC requirement if all the projects sold their full production into this market. This analysis conservatively assumes that all these landfills will transport their gas to Massachusetts. This assumption ignores the more likely scenario whereby these 7 projects will sell all or part of their gas to other states for economic reasons, e.g., the availability of generation and transportation closer to their gas production sites. In addition, some projects may already have local commitments, may not be connected to common carriers (i.e., interstate natural gas pipelines), or may not be able to secure transportation contracts to or sales contracts with electric generators in New England. As a result, it is far more likely that the impact of existing LMG projects in Massachusetts REC market will be in the range of 25 to 50% of the total or no more than 3-6% of the 2013 MA REC requirement.

Table 3 - Potential Impact of Existing High Btu Projects

State	# High Btu Projects	Waste in Place (tons) [1]	LFG Flow to Project (mmscfd) [1]	Gas Product (Dt/d) [2]	Annaul Gas Production (Dt/yr) [3]	Annual Energy (MWh) [4]	% of 2013 MA REC Requirement
AR	1	2,453,458	1.44	648	236,520	18,922	--
KS	1	20,000,000	7.00	3,150	1,149,750	91,980	--
LA	1	5,500,000	2.16	972	354,780	28,382	--
MI	1	3,000,000	0.86	389	141,912	11,353	--
NY	1	108,361,626	14.00	6,300	2,299,500	183,960	[5]
OH	3	25,150,000	17.67	7,952	2,902,626	232,210	4.8%
PA	7	54,009,937	29.66	13,347	4,871,819	389,746	8.1%
TX	2	55,388,718	15.15	6,818	2,488,388	199,071	--
TOTAL	17						
2013 MA REC Requirement (MWh)							4,811,283
Potential Impact Assuming 25-50% Transport into MA Market							**3-6%**

[1] Reported in EPA LMOP Database
[2] Gas product = LFG Flow (mmscfd) x 0.50 (est. methane content) x 0.90 (efficiency factor) x 1000 Dt/cf
[3] Gas product (Dt/d) x 365 d/yr
[4] Annual gas production / 7.5 MMBtu/MWh (average heat rate of GE7FA combined cycle resource in MA) x 0.60 (assumes 60% capacity factor of power plants/gas pipelines to convert gas into RECs in MA)
[5] Not applicable to MA market, committed local purchaser

CESI also analyzed theoretical projects, that is, existing landfills of appropriate size (more than 4 million WIP) that have no plans to develop high Btu LMG utilization projects. These potential 12 projects were analyzed based on their size and location, but without taking into consideration likely development constraints including proximity to pipelines. CESI analyzed potential projects in New England as well as in New York, PJM and Canada.

CESI assumed, based upon its extensive development experience with existing projects in terms of cost and development time, and given existing pipeline locations and interconnection challenges, that it would be very optimistic to assume that more than 20-30% of the potential market might be developed over the next 5 years. On this basis, the potential impact on the 2013 Massachusetts REC market is likely to be no more than 6-8.5% for theoretical projects in the northeast, PJM and Canada in addition to the potential impact from existing high Btu projects. This is set forth in Table 4 below.

Table 4 - Potential Impact of Potential High Btu Projects

Region	# of Potential Landfills and States	Waste in Place (tons) [1]	LFG Flow to Project (mmscfd) [2]	Gas Product (Dt/d) [3]	Annaul Gas Production (Dt/yr) [4]	Annual Energy (MWh) [5]	Maximum % of 2013 MA REC Requirement
New England (ISO NE)	1 in CT and 1 in MA	10,816,937	9.346	4,206	1,535,053	122,804	2.6%
Northeast (PJM (w/o OH), New York ISO)	5 in PA and 2 in MD	50,423,472	43.566	19,605	7,155,696	572,456	11.9%
PJM (Ohio)	3 in OH	34,210,719	29.558	13,301	4,854,912	388,393	8.1%
TOTAL	12	95,451,128	82.470	37,111	13,545,660	1,083,653	22.5%
2013 MA REC Requirement (MWh)							4811283
Potential Impact Assuming 20-30% Likely Development Success							5-7%

[1] Reported in EPA LMOP Database
[2] Assumes average 600 scfm of gas flow x 24 hr/day x 60 min/hr / 1,000,000 to get mmscfd
[3] Gas product = LFG Flow (mmscfd) x 0.50 (est. methane content) x 0.90 (efficiency factor) x 1000 Dt/cf
[4] Gas product (Dt/d) x 365 d/yr
[5] Annual gas production / 7.5 MMBtu/MWh (average heat rate of GE7FA combined cycle resource in MA) x 0.60 (assumes 60 % capacity factor of power plants/gas pipelines to convert gas into RECs in MA)

Region	# of Potential Landfills and States	Waste in Place (tons)	LFG Flow to Project (mmscfd) [1]	Gas Product (Dt/d) [2]	Annaul Gas Production (Dt/yr) [3]	Annual Energy (MWh) [4]	Maximum % of 2013 MA REC Requirement
Eastern Canada	8 in Eastern CD	32,000,000	27.648	12,442	2,724,710	217,977	4.5%
Potential Impact Assuming 20-30% Likely Development Success							1-1.5%

Existing DOER Regulations Should Be Amended to Eliminate LMG Restrictions

In order to fully conform to the Legislature's intent to include landfill gas without restriction, CESI proposes that the existing regulation, CMR 225 14.05: Eligible Criteria for New Renewable Generation Units (1)(a) 5 be amended to eliminate any restriction of the usability of LMG as an eligible fuel for generating units in Massachusetts. Specifically, the regulation should be amended as follows:

Existing Regulation:

(1)(a) 5. Landfill methane gas and anaerobic digester gas provided that such gas is collected and conveyed directly to the Generation Unit without the use of facilities used as common carriers of natural gas.

Proposed Regulation:

Strike "provided that such gas is collected and conveyed directly to the Generation Unit without the use of facilities used as common carriers of natural gas"

And

Add, "including such gas that is transported to the Generation Unit through a common carrier pipeline and commingled with natural gas".

With these amendments, the new regulation would read as follows:

(1)(a)5. Landfill methane gas and anaerobic digester gas, including such gas that is transported to the Generation Unit through a common carrier pipeline and commingled with natural gas."

Conclusion

By removing the common carrier restriction and allowing the commingling and co-firing of high Btu landfill methane gas with natural gas, the Commonwealth of Massachusetts would join its neighbors in the Northeast and provide Massachusetts consumers with the significant benefits without adverse market impacts. CESI and Beacon look forward to working with the DOER to develop a regulatory policy that allows LMG without limitation to qualify as an eligible resource.

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